

SYNTHESIS OF MODIS CALIBRATION

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Data available from pre-launch calibration

- 1. Initial calibration algorithms provided by SBRC**
- 2. Laboratory measurement characteristics and data**
- 3. Ambient and T/V measurement data for on-board calibrators**

MODIS on-board & vicarious calibration sources

on-board calibrators

- . Solar diffuser and SDSM
- . SRCA (spectral, radiometric, and spatial)
- . Space view (zero radiance)
- . Blackbody at 285K or/and 315K

Vicarious calibration methods

- . Aircraft radiance measurement
- . Ground reflectance-based calibration
- . Radiance-based measurement by lunar observation
- . Solar-radiation-based calibration
- . Oceanic ship and buoy measurement
- . Cross calibration with other on-board sensors

Image-derived calibration

- . Striping in-band image by histogram equalization
- . Curve-fit to solar spectral curve for between-band normalization
- . Long-term radiometric stability monitoring by 10–100 sites on the earth
- . Earth night-viewing for space count bias check
- . Automated calibration-site-based radiometric rectification
- . MTF inversion
- . Correct radiometric errors introduced by stray- & ghost-light

Radiometric calibration accuracy

A multiple calibration approach assures high radiometric accuracy to the MODIS

1. VS/NIR/SWIR (claimed)

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| (1) Solar diffuser, SDSM, SRCA | $\pm 4.0\%$ |
| (2) Aircraft radiance measurement | $\pm 4.0\%$ |
| (3) Ground-based reflectance calibration | $\pm 3.5\%$ |
| (4) Ground radiance-based calibration | $\pm 3.0\%$ |
| (5) Solar-radiation-based calibration | $\pm 3.0\%$ |
| (6) Radiance-based measurement by lunar observation | $\pm 3.0\%$ |
| (7) Cross calibration with other satellite sensors | $\pm 3.5\%$ |
| (8) Oceanic ship and buoy measurement | (assume $\pm 3.0\%$) |

2. MWIR/LWIR

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| (1) On-board blackbody, space view | $\pm 1.0\%$ |
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Calibration activation during MODIS in orbit

- 1. Evaluate the instrument stability in space environment.**
- 2. The instrument output is compared to the pre-launch characteristics.**
- 3. Data collected from on-board calibrators and vicarious calibration sources.**
- 4. Produce calibration coefficients after giving weighted coefficient to each calibration source.**
- 5. Calibration committee coordinates MODIS calibration.**
- 6. Validation, diagnosis, and improvement of calibration performance.**

